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Effect of heat treatment on mechanical properties of plywood made of veneers glued pre-treatment with UF resins and post-treatment

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2012 IUFRO INTERNATIONAL UNION
OF FOREST RESEARCH
ORGANIZATIONS
CONFERENCE
DIVISION 5
FOREST PRODUCTS

8 › 13 JULY '12 - ESTORIL CONGRESS CENTRE, LISBON, PORTUGAL

**FINAL PROGRAM,
PROCEEDINGS
AND ABSTRACTS BOOK**

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ORGANIZING ENTITIES



DIVISION 5 - FOREST PRODUCTS

Coordinator

Andrew Wong, Malaysia

Deputies:

Jamie Barbour, United States

Dave Cown, New Zealand

Pekka Saranpää, Finland

INTERNATIONAL ORGANISING COMMITTEE

Conference Chair

Pekka Saranpää (Finland)

Conference Co-Chair

Jamie Barbour (USA)

Scientific Committee

Andrew Wong (Malaysia)

Dave Cown (New Zealand)

Helena Pereira (Portugal)

Jamie Barbour (USA)

Jerry Winandy (USA)

LOCAL ORGANISING COMMITTEE

Chair

Helena Pereira

Vice-rector of the Technical University of Lisbon, full professor of ISA (School of Agronomy), president secretary of the Forest Research Centre/ Centro de Estudos Florestais (CEF).

Jorge Gominho, CEF, ISA

Isabel Miranda, CEF, ISA

Sofia Knapic, CEF, ISA

Francisca Lima, AIFF (Competitiveness and technology center for forest industries)

Pedro Cardoso, THE (local PCO)

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WELCOME MESSAGE

from IUFRO Division 5 Coordinator
and Conference Chairman



Dear friends and colleagues,

The IUFRO Forest Products conference is an important scientific meeting for the IUFRO Division 5 research community and others, being held every 4-5 years for several years now. On behalf of IUFRO Division 5 (Forest Products), we as respectively, Coordinator of IUFRO Division 5 and conference Chairman, are delighted to welcome you to this 2012 All Division 5 conference in Estoril, Portugal. We are honored that the IUFRO conference has the support not only of The Instituto Superior de Agronomia (ISA) and The Forest Research Centre (CEF) within The Technical University of Lisbon, but also from several major national and international sponsors and scientific organisations.

Planning for this conference has been building steadily over the last two years since the local hosts won the bid to host this meeting, and has involved a considerable amount of coordination and hard work from the International Organizing Committee and the professional conference organizer appointed by the Local Organizing Committee. The week's conference proceedings would not have been possible without the passionate efforts of all concerned. Also, we do recognize all D5 Unit Coordinators and deputies. Without your expertise and the time you have spent to organize the sessions this conference would not have been possible. Thanks to you the IUFRO Division 5 is rather unique by having a regular Forest Products Conference. Besides being a gathering of many of the world's forest products scientists (not necessarily IUFRO members alone) under one roof to foster networking and useful contacts among your peers, the conference gives opportunities to present new findings/technologies overall that would be beneficial to society. It is a platform to contribute directly to the overall structure and goals of D5 and to help influence IUFRO policy through participation at its research unit business meetings.

This is designated as a "Green Conference" and you may have noted that the 5 conference themes take into account also the relevant thematic areas of the 2010-2014 IUFRO Strategy. The conference will address these issues affecting forest products in its various technical sessions and by keynote speakers: Forests for People; Resources for the Future; Bioenergy; Forest and Climate Change and Wood in Construction. This is a unique opportunity for you to consider linking your on-going research and presentations to both the conference themes and also contribute to the current 8 thematic areas of the 2010-2014 IUFRO Strategy. Scientific progress in forest products research is advancing with new tools and technology for research, novel areas of research encompassing areas of nanoscience, molecular biology, biotechnology and genetics, bioenergy, environmental aspects – the buzz words that are fast becoming the mainstay of forest products research in the 21st century. Nevertheless, traditional wood technology research continues to be relevant and impact upon the future well-being of the global environment.

IUFRO – The International Union of Forest Research Organizations – is a non-profit, non-governmental international network of forest research scientists, and is a major organization with wide networks of internationally recognized researchers sharing common grounds – to foster global cooperation in forest-related research and promote understanding of technical, economic and social aspects of its research and utilization of forests and their multiple wood and non-wood resources. IUFRO members are thus encouraged, through their research activities, to continually help make IUFRO more visible globally in forest science and promote science-based knowledge to a wider audience in line with the goals of the current IUFRO Strategy. We would similarly encourage non-member delegates to consider joining IUFRO and contribute to the goals of D5 and IUFRO overall.

As you will take this opportunity during the conference week to interact and develop international cooperation, and also to be part of the IUFRO network, we wish all delegates a most fruitful and eventful conference.



Andrew Wong
Coordinator, IUFRO D5
University Malaysia Sarawak
Kota Samarahan, Sarawak, Malaysia



Pekka Saranpää
Conference Chair
Deputy Coordinator, IUFRO D5
Finnish Forest Research Institute, Vantaa, Finland

DIVISION 5 FOREST PRODUCTS

PRODUITS FORESTIERS - PRODUCTOS FORESTALES - HOLZ UND ANDERE FORSTPRODUKTE

Coordinator: Andrew Wong, Malaysia

Deputies: Jamie Barbour, United States; Dave Cown, New Zealand; Pekka Saranpää, Finland

5.01.00 Wood quality Qualité du bois Calidad de la madera Holzqualität C Pekka Saranpää, Finland D Pauline Fernández, Chile D Jianxiong Lu, China D Elspeth MacDonald, United Kingdom D Katsuhiko Takata, Japan	5.03.05 Biological resistance of wood Résistance biologique du bois Resistencia biológica de la madera Biologische Beständigkeit von Holz C Nasko Terziev, Sweden D Jinzhen Cao, China D Sung-Mo Kang, Korea (Rep)	5.04.08 Sawing, milling and machining Sciage et usinage Aserrado y maquinado Sägen und Holzbearbeitung C Roger Hernandez, Canada D Pierre-Jean Meausoone, France D Takeshi Ohuchi, Japan	5.10.00 Forest products marketing and business management Commercialisation des produits forestiers et développement de l'entreprise Comercialización de productos forestales y gestión de empresas Vermarktung von Forstprodukten und Betriebsführung C Eric Hansen, United States D Paul Dargusch, Australia D Rob Kozak, Canada D Toshiaki Owari, Japan D Anne Toppinen, Finland D Richard Vlosky, United States
5.01.04 Wood quality modelling Modélisation de la qualité du bois Modelación de la calidad de madera Modellierung der Holzqualität C Jean-Michel Leban, France D Joseph Gril, France D Heli Peltola, Finland D Christine Todoroki, New Zealand	5.03.06 Wood protection for quarantine, food packing and trade in wood Protection du bois dans la quarantaine, l'emballage et le commerce du bois Protección de la madera para cuarentena, embalaje de alimentos y comercio de maderas Holzschutz zur Erfüllung von Quarantäne-, Lebensmittelverpackungs- und Holzhandelsvorschriften C Magdalena Kutnik, France D Hugh Bigsby, New Zealand D Donatien Pascal Kamdem, United States	5.04.13 Industrial engineering, operations analysis and logistics Ingénierie industrielle, analyse des opérations, et logistique Ingeniería industrial, análisis de operaciones y logística Industrielle Verarbeitung, Verfahrenstechnik und Logistik C Henry Quesada-Pineda, United States D Omar Espinoza, United States D Roger Moya Roque, Costa Rica	5.10.01 Wood culture Culture du bois Cultura de la madera Holzkultur C Howard N. Rosen, United States D Victoria Asensi Amoros, France D Monlin Kuo, United States D Yang Ping, Japan D Jinling Su, China D Mario Tornazello Filho, Brazil
5.01.07 Tree ring analysis Analyse des cerne Análisis de anillos de crecimiento Jahrringanalyse C Margaret Devall, United States D Paolo Cherubini, Switzerland	5.03.07 Wood protection under tropical environments Protection du bois sous les tropiques Protección de la madera bajo condiciones tropicales Holzschutz in den Tropen C Marie-France Thevénon, France D Osvaldo Encinas, Venezuela D Andrew Wong, Malaysia	5.05.00 Composite and reconstituted products Composites et produits reconstitués Materiales compuestos y productos reconstituídos Verbundwerkstoffe und Leimholzprodukte C S. Salim Hizioglu, United States D Marius Barbu, Romania D Zhiyong Cai, United States D Tatsuya Shibusawa, Japan	5.11.00 Non-wood forest products Produits forestiers non-ligneux Productos forestales no leñosos Nichtholz-Forstprodukte C A.L. "Tom" Hammett, United States D James Chamberlain, United States D Madhav Karki, Nepal D Pawel Staniszewski, Poland D Paul Vantomme, Italy
5.01.08 Understanding wood variability Comprendre la variabilité du bois Entender la variabilidad de la madera Holzvariabilität verstehen C Barbara Lachenbruch, United States D Paul McLean, United Kingdom D John Moore, New Zealand	5.03.10 Protection of cultural artefacts Protection des artefacts culturels Protección de objetos culturales Schutz von Kulturgegenständen C Wibke Unger, Germany D Geoffrey F. Daniel, Sweden D Donatien Pascal Kamdem, United States D Marie-France Thevénon, France	5.06.00 Properties and utilization of plantation wood Propriétés et utilisation du bois provenant des plantations Propiedades y utilización de madera proveniente de plantaciones Eigenschaften und Verwendung von Plantagenholz C Roger Meder, Australia D Yafang Yin, China	5.11.02 Medicinal forest products Produits forestiers médicinaux Productos forestales medicinales Waldprodukte in der Medizin C Carsten Smith Olsen, Denmark D Giridhar A. Kinhal, Nepal
5.02.00 Physiomechanical properties of wood and wood based materials Propriétés physiomécaniques et utilisations du bois et des matériaux dérivés du bois Propiedades fisiomecánicas y aplicaciones de la madera y de materiales compuestos en base a madera Physiomechanische Eigenschaften und Anwendungen von Holz und Holzwerkstoffen C Xiping Wang, United States D John Moore, New Zealand D Lihai Wang, China	5.03.11 Protection by surfacing and finishing Protection du bois par le revêtement et la finition Proteger la madera con recubrimientos y acabados Holzschutz durch Beschichtung und Finish C Philippe Gerardin, France D Andre Merlin, France D Martino Negri, Italy	5.06.01 Utilization of dry area timber Utilisation du bois provenant des terres sèches Utilización de madera proveniente de zonas áridas Verwendung von Holz aus Trockengebieten C Nick Pasiecznik, France D George Muthike, Kenya	5.11.03 Edible forest products Produits forestiers comestibles Productos forestales comestibles Nahrungsmittel aus dem Wald C Susan J. Alexander, United States D Sarah W. Workman, United States
5.02.01 Non-destructive evaluation on wood and wood-based materials Evaluation non destructive du bois et des matériaux dérivés du bois Evaluación no destructiva de madera y materiales compuestos en base a madera Nicht zerstörende Evaluierung von Holz und Holzwerkstoffen C Xiping Wang, United States D Roger Meder, Australia D Houjiang Zhang, China	5.04.00 Wood processing Transformation du bois Transformación de la madera Holzbearbeitung C Marius Barbu, Romania D Mihaela Campean, Romania D Jegatheswaran Ratnasingam, Malaysia	5.06.02 Utilization of planted teak Utilisation du teck provenant des plantations Utilización de madera de teca proveniente de plantaciones Verwendung von Teakholz aus Plantagen C P.K. Thulasidas, India D vacant	5.11.05 Bamboo and rattan Bambou et rotin Bambú y ratán Bambus und Rattan C Jinhe Fu, China D Johan Gielis, Belgium D Lay Thong Hong, Malaysia
5.02.02 Fundamental properties of wood and wood-based materials Propriétés fondamentales du bois et des matériaux dérivés du bois Propiedades fundamentales de madera y materiales compuestos en base a madera Grundlegende Eigenschaften von Holz und Holzwerkstoffen C Hongmei Gu, United States D Raquel Goncalves, Brazil	5.04.06 Wood drying Séchage des bois Secado de la madera Holztrocknung C Diego Elustondo, Canada D Agron Bajraktari, Republic of Kosovo D Süleyman Korkut, Turkey D Gan Kee Seng, Malaysia	5.06.03 Utilization of planted eucalypts Utilisation de l'eucalyptus provenant des plantations Utilización de madera de eucalyptus proveniente de plantaciones Verwendung von Eukalyptusholz aus Plantagen C Jose Nivaldo Garcia, Brazil D Roger Meder, Australia D Yongdong Zhou, China	5.12.00 Sustainable utilization of forest products Utilisation durable des produits forestiers Utilización sostenible de productos forestales Nachhaltige Verwendung von Walderzeugnissen C Robert Deal, United States D Ying Hei Chui, Canada D Choi Don Ha, Korea (Rep)
5.03.00 Wood protection Protection du bois Protección de la madera Holzschutz C Donatien Pascal Kamdem, United States D Gyu-Hyeok Kim, Korea (Rep) D Adya P. Singh, New Zealand D Andrew Wong, Malaysia	5.04.07 Adhesives and gluing Collage des bois Adhesivos y encolado Holzverleimung C Hui Pan, United States D Warren Grigsby, New Zealand D Shujun Li, China D Tohmura Shin-ichiro, Japan	5.07.00 Energy and chemicals from forest biomass Energie et produits chimiques de la biomasse forestière Energía y productos químicos de la biomasa forestal Energie und chemische Produkte aus forstlicher Biomasse C vacant D Hyeun-Jong Bae, Korea (Rep) D Fuxiang Chu, China D Alan Rudie, United States	5.14.00 Forest products education Formation en matière de produits forestiers Educación en productos forestales Ausbildung im Bereich der Walderzeugnisse C Rupert Wimmer, Germany D Aldo Ballerini, Chile D Jamie Barbour, United States D Sudipta Dasmohapatra, United States

BEST POSTER AWARDS

The Scientific Committee wishes to encourage scientists to display outstanding posters during the IUFRO Division 5 conference.

An Awarding Body will evaluate all the posters exhibited during the poster sessions, based upon the following selection criteria:

1. Presentation: layout (attractiveness, legibility, creativity)
2. Content: innovative ideas and value of subject matter
3. Presenter's ability to convey the message

The awards will be presented at the Conference dinner, on July 11 and consist of a certificate and a gift sponsored by 3DCork – www.3dcork.com

ACKNOWLEDGMENTS

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REGISTRATION DESK

DAY	TIME
Sunday, July 8	14h-18h00
Monday, July 9	08h-18h00
Tuesday, July 10	08h-18h00
Wednesday, July 11	08h-13h00
Thursday, July 12	08h-18h00
Friday, July 13	08h-16h00

TECHNICAL VISITS JULY 11

- Departure time: 12h15
- Technical Visit 1 - Corticeira Amorim
- Technical visit 2 - Espirra Estate (Portucel Soporcel Group)
- Technical visit 3 - Industrial Plant "About the future" (Portucel Soporcel Group)
- Technical visit 4 - Companhia das Lezírias
- Technical visit 5 - Pinhal de Leiria

SOCIAL EVENTS

WELCOME RECEPTION, JULY 9

Venue: Estoril Conference Centre

Time: 17h30

Description: Wine and cheese cocktail and poster viewing will take place at ground floor of Estoril Conference Centre

ACCOMPANYING PERSONS' TOUR, JULY 10

Meeting point: Registration desk at conference centre

Time: 09h30

Description: Tour of Lisbon

This program will combine a walking tour in the city centre that will allow guests to discover hidden corners of the cities old quarters.

Shopping in the city centre is a pleasure: there are different spaces tailored to a wide array of tastes, so we will allow some free time for shopping.

Lunch will take place at Terreiro do Paço square.

After lunch the tour will continue to Belém area closely associated with the age of the discoveries. Discoveries led to empire, wealthy, exploitation and colonization, all now in the past. Today Belém's exquisite buildings and museums displays celebrate navigational skills in general as much as the feats of Portugal's courageous mariners. Panoramic tour to Jerónimos Monastery, Belém Tower and Monument of Discoveries.

The tour finishes with a tasting of Pastéis de Belém, one of Portuguese most famous patries.

CONFERENCE DINNER, JULY 12

Venue: Casino do Estoril

Time: 19h30

Description: Casino do Estoril is the oldest casino in Portugal and the biggest in Europe. Apart from the main activities, there is also an art gallery specialized in modern painting and sculpture.

Upon arrival guests will have a welcome drink in the beautiful gardens followed by 3 course dinner in the main room.

Please note that NO TRANSPORTATION will be provided by the Organization.

PROGRAM AT A GLANCE

Time	SUNDAY 8	MONDAY 9	TUESDAY 10	WEDNESDAY 11	THURSDAY 12	FRIDAY 13
0800-0830		Registration, welcome coffee	Registration			
0830-0900			Jack Saddler Keynote 2	Klaus Richter Keynote 3	Madhav Karki Keynote 4	Rich Vlosky Keynote 5
0900-0930						
0930-1000		OPENING CEREMONY	BREAK			
1000-1030			5 Technical session rooms	IAWS Academy lecture	7 Technical session rooms	7 Technical session rooms
1030-1100						
1100-1130		Eduardo Rojas-Briaies Keynote 1		Sub plenary Biorefinery		
1130-1200						
1200-1300		LUNCH				
1300-1330		7 Technical session rooms	6 Technical session rooms	In-congress tour / technical visits	6 Technical session rooms	6 Technical session rooms
1330-1400						
1400-1430	Registration and Poster Fixing					
1430-1500						
1500-1530		BREAK			BREAK	
1530-1600		6 Technical session rooms	5 Technical session rooms		RG Business meeting	Technical Group Reporting
1600-1630						
1630-1700					Poster Session 2	
1700-1730						
1730-1800		Wine and Cheese Cocktail	RG Business meeting			Resolutions / Closing
1800-1830		Poster Session 1				
1830-1900						
1900-1930						
1930-2000		IAWA SOCIAL HOUR	IAWS DINNER		CONFERENCE DINNER	
2000-2030						

TIME	SESSION NAME			ROOM	RG
08h00-09h30	Registration & welcome coffee				
09h30-11h00	OPENING CEREMONY			Auditorium	
TIME	SESSION NAME	MODERATOR	ABSTRACT REF.	ROOM	RG
11h00-12h00	Eduardo Rojas-Briales - Global and European Challenges of Forests Moving towards Green Economies	Pekka Saranpaa	KN01	Auditorium	Plenary 1
LUNCH					
13h00-15h00	Wood Quality	Pekka Saranpaa	OP001, OP002, OP003, OP004, OP005, OP006	Auditorium	5.01.00
	Properties and utilisation of plantation wood – Wood Quality and Utilisation	José Nivaldo Garcia	OP007, OP008, OP009, OP010, OP011, OP012	E	5.06.00
	CT and X-ray Applications to Wood Processing	Franka Bruechert	OP013, OP014, OP015, OP016, OP017, OP018, OP019	F1-F3	5.02.00
	Natural durability	Nasko Terziev & MF Thevenon	OP020, OP021, OP022, OP023, OP024	F7	5.03.00 / IRGWP
	Wood processing – Adhesives & Surface	Marius Barbu	OP025, OP026, OP027, OP028, OP029, OP030	C1-C3	5.04.00
	Non-wood Forest Products	Tom Hammett	OP031, OP032, OP033, OP034, OP035, OP036	F4-F6	5.11.00
	Cork	Miguel Cabral	OP037, OP038, OP039, OP040, OP041	CA-C6	Cork 1
COFFEE BREAK					
15h30-17h30	Composite and Reconstituted Products	Salim Hiziroglu & Marius Barbu	OP042, OP043, OP044, OP045, OP046	Auditorium	5.05.00
	Physiological and adaptive changes in wood	Barry Gardiner	OP047, OP048, OP049, OP050, OP051	E	5.01IAWA
	Energy and Chemicals from Forest Biomass	Hyeun-Jong Bae & Jamie Barbour	OP052, OP053, OP054, OP055, OP056	F1-F3	5.07.00
	CT and X-ray Applications to Wood Processing	Udo Sauter	OP057, OP058, OP059, OP060, OP061, OP062, OP063	F4-F6	5.02.00
	Pulp & Paper-Biorefinery and Wood Chemistry	Dominique Lachenal	OP064, OP065, OP066, OP067, OP068	F7	5.15.00
	Wood processing – Drying	Marius Barbu	OP069, OP070, OP071, OP072, OP073, OP074	C4-C6	5.04.00
17h30-19h30	WINE AND CHEESE COCKTAIL / Poster Session 1				
19h30-20h30	IAWA SOCIAL HOUR				

JULY 10

TIME	SESSION NAME	MODERATOR	ABSTRACT REF.						ROOM	RG/WP
08h30-09h30	Jack Saddler – The Biorefining Story: Progress in the commercialization of biomass-to-fuels and chemicals (The influence of the biomass fedstock on the process and products)	Jamie Barbour	KN02						Auditorium	Plenary 2
COFFEE BREAK										
10h00-12h00	Environmental and developmental controls on wood quality	Barb Lachenbruch	OP075, OP077, OP078						Auditorium	5.01.08
	Wood processing – Sustainability	Marius Barbu & Henry Quesada Pineda	OP079, OP080, OP081, OP082, OP083, OP084						E	5.04.00
	Sustainable utilization of forest products	Bob Deal & Jamie Barbour	OP085, OP086, OP087, OP088, OP089, OP090						F1-F3	5.12.00
	Non-destructive Evaluation Techniques	Xiping Wang	OP091, OP092, OP093, OP094, OP095, OP096						F4-F6	5.02.00
	Forest Products Marketing and Business Management	Rich Vlosky	OP307, OP097, OP098, OP099, OP100, OP101						F7	5.10.00
LUNCH										
13h00-15h00	Emerging wood preservatives	Philippe Gerardin & Joran Jermer	OP102, OP103, OP104, OP105, OP106						Auditorium	5.03.00/IRGWP
	Genetic options for altering wood quality	Hisahi Abe	OP107, OP108, OP109, OP110, OP111						E	5.01.08
	Composite and Reconstituted Products	Salim Hiziroglu & Marius Barbu	OP112, OP113, OP114, OP115, OP116						F1-F3	5.05.00
	Properties and utilisation of plantation wood – New Materials from Plantation Wood	Yin Yafang	OP117, OP118, OP119, OP120, OP121, OP122						F4-F6	5.06.00
	Non-destructive Evaluation Techniques	Roger Meder	OP124, OP125, OP126, OP127, OP128, OP129						F7	5.02.00
	Turning by products in Biomaterials	Marie-Pierre Laborie	OP130, OP131, OP132, OP133, OP134, OP135						C1-C3	5.07.00
COFFEE BREAK										
15h30-17h30	Forest Products Marketing and Business Management	Eric Hansen	OP136, OP137, OP138, OP139, OP140, OP141						Auditorium	5.10.00
	Non-wood Forest Products	Tom Hammett & Madhav Karki	OP142, OP143, OP144, OP145						E	5.11.00
	Within-tree variability in wood quality and anatomy	Sabine Rosner	OP146, OP147, OP148, OP149, OP150						F1-F3	5.01.IAWA
	Integrating forest products with ecological services	Jamie Barbour	OP151, OP152, OP153, OP154, OP155, OP156						F4-F6	5.12.00
	Pulp & Paper-Nanocrystalline Cellulose	Raymond C. Francis	OP157, OP158, OP159						F7	5.15.00
17h30-18h30	RG Business Meeting - Wood Quality							E	5.01.00	
	RG Business Meeting - Physiomechanical properties of wood and wood-based materials							F1-F3	5.02.00	
	RG Business Meeting - Wood Protection							F4-F6	5.03.00	
	RG Business Meeting - Wood Processing							F7	5.04.00	
	RG Business Meeting - Composite and Reconstituted Products							C1-C3	5.05.00	
	RG Business Meeting - Properties and utilisation of plantation wood							C4-C6	5.06.00	
19h30 – 22h00	IAWS DINNER									

TIME	SESSION NAME	MODERATOR	ABSTRACT REF.	ROOM	RG
8h30-9h30	Klaus Richter - Wood in Construction – Including Multi-Storey Building	Dave Cown	KN03	Auditorium	Plenary 3
10h00-11h00	Lennart Salmén - The wood fibre structure – how to be utilized?	Rupert Wimmer	SP01	Auditorium	5.01/IAWS Academy Lecture
COFFEE BREAK					
11h00-12h00	Jorge Colodette – The Brazilian Forestry Industry Focusing on Eucalypt	Tarja Tamminen	SP02	Auditorium	Subplenary 1
	Helena Pereira – The importance of biomass structure and chemical composition for biorefineries	Tarja Tamminen	SP03	Auditorium	Suplenary 2
12h15-19h00	TECHNICAL VISITS				

JULY 12

TIME	SESSION NAME	MODERATOR	ABSTRACT REF.	ROOM	RG
08h30-09h30	Madhav B. Karki – Enhancing the contribution of non-timber forest products in supporting green economy and sustainable development in mountain countries	Andrew Wong	KN05	Auditorium	Plenary 4
COFFEE BREAK – Sponsored by Forest Stewardship Council (FSC) www.fsc.org					
10h00-12h00	Flexwood	Luc LeBel	OP160, OP161, OP162, OP163, OP164, OP165	Auditorium	5.01.01
	Wood quality modeling	Geoff Downes	OP166, OP167, OP168, OP169, OP170	E	5.01.04
	Properties and utilisation of plantation wood – Teak	Henri Bailleres	OP171, OP172, OP173, OP174, OP175	F1-F3	5.06.00
	Recent development in wood protection	Cao Jinzhen & DP Kamdem	OP176, OP177, OP178, OP179, OP180, OP181	F4-F6	5.03.00 / IRGWP
	Energy from the forest, IUFRO's Biomass Task Force	Jamie Barbour & Hyeun-Jong Bae	OP182, OP183, OP184, OP185, OP186, OP187	F7	5.07.00
	Emerging wood preservatives (2)	Magdalena Kutnik & Andrew Wong	OP188, OP189, OP190, OP191, OP192, OP193	C1-C3	5.03.00 / IRGWP
	Sawing, milling and machining – Tools	Jega Ratnasingam & Roger Hernandez Pena	OP194, OP195, OP196, OP197, OP198, OP199	C4-C6	5.04.08
LUNCH					
13h00-15h00	Composite and Reconstituted Products	Salim Hiziroglu & Marius Barbu	OP200, OP201, OP202	Auditorium	5.05.00
	Properties and utilisation of plantation wood – Lesser known species (particularly those from Africa)	P.K.Thulasidas	OP204, OP205, OP207, OP209, OP211	E	5.06.00
	Wood variation: utilization and identification	Paul McLean	OP212, OP213, OP214, OP215	F1-F3	5.01.08
	Fractionation of raw wood material for biobased products	Tarja Tamminen	OP216, OP217, OP218, OP219, OP220	F4-F6	5.07.00
	Protection of wood packaging	D Pascal Kamdem & Nasko Terziev	OP221, OP222, OP223, OP224, OP225, OP226	C1-C3	5.03.00 / IRGWP
	Wood Culture 1	Mario Tomazello	OP227, OP228, OP229, OP230, OP231, OP232, OP233	C4-C6	5.10.01
COFFEE BREAK – Sponsored by Forest Stewardship Council (FSC) www.fsc.org					
15h30-16h30	RG Business Meeting – Energy and Chemicals from Forest Biomass			E	5.07.00
	RG Business Meeting – Forest Products Marketing and Business Management			F1-F3	5.10.00
	RG Business Meeting – Non-wood Forest Products			F4-F6	5.11.00
	RG Business Meeting – Sustainable utilization of forest products			F7	5.12.00
	RG Business Meeting – Forest Products Education			C1-C3	5.14.00
	RG Business Meeting – Pulp & Paper			C4-C6	5.15.00
16h30-18h00	Poster Session 2				
19h30-22h30	CONFERENCE DINNER				

TIME	TITLE	MODERATOR	ABSTRACT REF.	ROOM	RG/WP
8h30-9h30	Rich Vlosky – Creating Competitive Advantage in a Global Recession	Helena Pereira	KN06	Auditorium	Plenary 5
COFFEE BREAK					
10h00-12h00	Wood quality	Pekka Saranpää	OP234, OP235, OP236, OP237	Auditorium	5.01.00
	Biodiversity and wood products paths to compatibility	Bob Deal & Jamie Barbour	OP238, OP239, OP240, OP241, OP242, OP243	E	5.12.00
	Tree ring analysis	Margaret Devall	OP244, OP245, OP246, OP247, OP248, OP249	F1-F3	5.01.07 / IAWA
	Field Performance of treated wood	MF Thevenon & Aree Abdluquader	OP250, OP251, OP252, OP253, OP254, OP255	F4-F6	5.03.00 / IRGWP
	Pulp & Paper-Pulp Bleaching	Ken Kaw	OP256, OP257, OP258, OP259	F7	5.15.00
	Properties and utilisation of plantation wood – Biomass Characterisation	José Nivaldo Garcia	OP260, OP261, OP262, OP263, OP264	C1-C3	5.06.00
	Wood Culture 2	Howard Rosen	OP266, OP267, OP268, OP269, OP270, OP271	C4-C6	5.10.01
LUNCH					
13h00-15h00	Protection of Cultural Artifacts	Wibke Unger	OP272, OP273, OP274, OP275, OP276, OP277	Auditorium	5.10.01 / 5.03.00 / IRGWP Special Session
	Wood quality from complex stand structures	Elspeth McDonald	OP278, OP279, OP280, OP281, OP282, OP283	E	5.01.00 Special Session
	Forest Products Education	Rupert Wimmer	OP284, OP285, OP287, OP288, OP289, OP290	F1-F3	5.14.00
	Pulp & Paper – Pulping	Eugene I-Chen Wang	OP291, OP292, OP293, OP294, OP295, OP296	F4-F6	5.15.00
	Processing of plantation wood and innovative technologies	Jega Ratnasingam & Marius Barbu	OP297, OP298, OP299, OP300, OP301, OP302	F7	5.04.08
	Cork	Helena Pereira	OP303, OP304, OP305, OP306	C1-C3	Cork 2
COFFEE BREAK					
15h30-17h30	TECHNICAL GROUP REPORTING			E	
17h30-18h00	RESOLUTIONS / CLOSING			Auditorium	



PROCEEDINGS

Resilin is a polymeric rubber-like protein secreted by insects to specialized cuticle regions, in areas where high resilience and low stiffness are required. Its unique mechanical properties allow the outstanding jumping ability of fleas, up to 30 cm high. The elastic properties of resilin are achieved by formation of di-tyrosine bridges within resilin monomers, generated by peroxidase enzymes, in the insect cuticles.

This highly resilience and elastic protein was optimized for expression in tobacco and was directed to the cell wall by a signal peptide. Cross-linking of resilin to the cell wall was enabled by utilizing the presence of natural plant cell wall peroxidases. Resilin was located in the cell wall by Immunohistochemistry and Increase in typical di-tyrosine blue florescence, of the cell wall, indicate resilin polymerization and cross-linking. The integration of resilin to the cell wall is expected to change and improve the mechanical properties of the plant and those of woody raw materials that are extracted from it. Moreover, changes in the formation of the plant cell wall, due to the cross-linking of resilin, improved sugars release from plant material, possibly by making cell wall cellulose more accessible for hydrolytic enzymes.

PP149

Effect of heat treatment on mechanical properties of veneers glued pre-treatment with UF resins and post-treatment with MUF resins

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The heat treatment of wood results in changes in the material that can be considered as an improvement (lightening of the material, increasing of decay resistance, lowering of MC, shrinkage and swelling reduction) and in some others as a lack in the material (strength decreases and stiffness as well behind given threshold). Wood derivatives are widely used in the automotive sector and in particular in the caravans sector were the lightweight is an essential requirement for the material used. An experimentation was undertaken in order to verify the effect of heat treatment on physical and mechanical properties of plywood panels. The tests were performed on poplar (I-214 clone) UF pre-glued plywood as well as on poplar and Ceiba (Ceiba pentandra Gaerth.) veneers glued post treatment by MUF adhesives. Veneers and panels were treated at 180°C for two different time periods, 23 hours (T1) and 33 hours (T2) with a dry mass lost going from 4 to 7 %. Two different pre-glued (UF adhesive) panel thicknesses were tested, 4.4 mm and 5.3 mm both with three layers. Two different post glued (MUF adhesive) panels were tested, one type made of 5 layers 7 mm thick fromager, the other made of 5 layers 9 mm thick poplar. Moisture content pre and post treatment (according to EN 322), density pre and post treatment (according to EN 323), MOE and MOR pre and post treatment (according to EN 310) and bonding quality pre and post treatment (according to EN 314) were assessed.

Keywords: poplar plywood, heat treatment, dry mass lost, strength, stiffness, EMC, bonding quality, MOE, MOR

PP150

Influences of checks on LVL mechanical properties

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INTRODUCTION

The LVL is an industrial material very popular in construction, is a material derived from wood popular in the wood-frame construction for the low dispersion of its outstanding mechanical properties, particularly in terms of axial stresses, which may go up twice a solid wood.

Keywords: lathe checks, veneer thickness, mechanical properties, LVL, peeling

PRESENTATION OF WORK DONE

In order to vary the parameter cracking, unwinding was carried out following several methods involving significant influences on the cyclic cracking (plating thickness, parboiling temperature and presence of bar pressure when peeling). Panels were glued and specimens were extracted. These were mechanically tested by several methods and types of solicitations.

MATERIALS AND METHODS

Sampling

This beech tree grew in the forest of Ponds, located in Saint Loup Ganges, Saone et Loire, Burgundy. The log (13m long and 0.45 m in diameter) which has been truncated in 19 raised beds of 0.6 m, numbered 1 to 19 starting from the ball of the foot.

Steaming

Before peeling, all the ridges were heated for 24 hours \pm 1 hour, or 20 °C or 70 °C by immersion in hot water bottles thermostated to \pm 1 °C.

Peeling

Fixed cutting this was done on the lathe instrumented industrial automation LaboMap SEM (Cluny, France). The speed was 1.5 m / s and the clearance angle of 1 °. When the pressure bar is active, the horizontal and vertical ribs are respectively 90% and 30% of the thickness of veneer. We produced three veneer layers (1, 3 and 5 mm) and have added higher thicknesses (6 and 7 mm).

Table 1 – Peeling modalities

Bolt number	14	4	15	13	4	14	19	17	3	9	8	18	16	11	7
Veneer thickness [mm]	1	3	5	1	3	5	1	3	5	6	7	1	3	5	7
Boiling temperature	20°C						70°C								
Pressure bar (PB)	Without PB			With PB			Without PB					With PB			